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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES



Appl. No. : 10/606,436 Confirmation No. 6928
Applicant : Steven M. Burns et al.
Filed : June 25, 2003
TC/A.U. : 1742
Examiner : Sikyin Ip

Docket No. : 085-10940 (03-325)
Customer No. : 52237

APPELLANT'S REPLY BRIEF

Sir:

This is in response to the Examiner's Answer mailed November 16, 2007, setting a two month shortened statutory period for response which expires on January 16, 2008.

Remarks/Arguments begin on page 2 of this paper.

REMARKS/ARGUMENTS

*A. Claims 15 - 23 Are Not Obvious
Over Burns*

Independent claim 15 is directed to a method for providing at least one workpiece having a coating which includes the step of "diffusion heat treating said at least one workpiece in gas atmosphere within a furnace with said gas being injected at a workpiece center location." Burns does not teach or suggest this step.

A reference is evaluated by what it teaches, not what it excludes. Nowhere in the rejection set forth on page 4 of the Examiner's Answer does the Examiner state where U.S. Patent No. 6,042,898 to Burns teaches the above diffusion heat treating step. The portion of Burns referred to by the Examiner, i.e. column 3, lines 31 to column 4, line 37, and col. 6, example 2, relate to an ionized gas stream cleaning process. There is nothing in these portions of Burns which discusses a diffusion heat treatment performed by injecting a gas at a workpiece center location. In fact, there is nothing in any of these portions which teaches or suggests performing the ionized gas stream cleaning by injecting a gas at a workpiece center location.

The Burns patent is clear that cleaning is performed by flowing an inert gas into the vacuum chamber and striking an arc between an electrode and a blade which superheats oxides and other contaminants on the blade's surface, causing the oxides and contaminants to vaporize.

The best argument that the Examiner can make is that nothing in the reference excludes flowing the gas to the center of the blade. Appellants submit even if this were

true, there is nothing here which teaches a diffusion heat treating step.

Nowhere in the rejection of claim 15 over Burns does the Examiner present any line of technical reasoning as to why the aforementioned diffusion heat treatment step would be obvious. Clearly, there is nothing in Burns which teaches or suggests that.

The Examiner clearly knows that a diffusion heat treatment step and a cleaning step are two different steps in a process. The Examiner on page 4 of the Examiner's Answer clearly says that "Burns does not disclose cleaning the workpiece during diffusion heat treatment step" This is an admission that the cleaning step is separate from the diffusion heat treatment step.

The Examiner goes on to say that "cleaning workpiece at any step is contemplated within ambit of ordinary skill artisan when the workpiece is contaminated." This statement, as best understood by Appellants, is simply wrong. The cleaning step in Burns is performed at a temperature far less than the temperature used during the diffusion heat treatment step in the instant invention. One of ordinary skill in the art because of this difference would never perform cleaning during the diffusion heat treatment step. It should also be noted that the Examiner's statement is not supported by any evidence. The Examiner has shown nothing in the prior art which performs cleaning during a diffusion heat treatment step.

Appellants submit that a rejection which uses a reference which is totally silent on a claim limitation to arrive at a conclusory statement that the claimed subject matter is obvious requires a leap which is not supported by the case law. The rejection, absent any teaching or

suggestion in the cited and applied reference or any line of technical reasoning which supports an obviousness conclusion, is nothing more than an impermissible hindsight rejection.

With respect to claim 16, it is allowable because Burns does not teach or suggest performing a diffusion heat treating step at the claimed temperature and time. Nowhere in the rejection does the Examiner point out where the claimed subject matter can be found in the reference or why it would be obvious. The cleaning step in Burns is performed at much lower temperatures than those claimed.

With respect to claim 17, the Examiner on pages 4 - 5 takes the position that to adjust the gas flow rate in order to balance cost of gas and cleanness of the gas is nothing more than discovering an optimum value. This position is without merit. Claim 17 calls for injecting the gas into the center location at a rate sufficient to carry away contaminants but less than a rate at which a door to said furnace is caused to open. The position taken by the Examiner ignores the fact that there is nothing which teaches injecting the gas at the claimed rate into the center location. As previously discussed, Burns merely injects the gas into the chamber.

With respect to claim 18, this claim is allowable because the Examiner has not presented any argument in the rejection as to where the claimed step of injecting said gas into said workpiece center location at a partial pressure of at least 0.8 Torr during the diffusion heat treatment step can be found in Burns or why such step is obvious over Burns.

Claim 21 is allowable because there is nothing in Burns which teaches or suggests injecting an inert gas into

said workpiece center location as part of a diffusion heat treating step. The rejection of record is silent on this point.

Claim 22 is allowable because there is nothing in Burns which teaches or suggests injecting argon into said workpiece center location as part of a diffusion heat treating step. The rejection of record is silent on this point.

Claim 23 is allowable because there is nothing in Burns which teaches or suggests injecting a reducing gas into said workpiece center location as part of a diffusion heat treating step. The rejection of record is silent on this point.

B. Claims 1 - 14, 28 and 29 Are Allowable Over Burns In View Of JP 62139810 or JP 2003027209

Claim 1 is directed to a method for heat treating at least one workpiece which includes the steps of: "cleaning a furnace to be used during said heat treating method;" "said cleaning step comprising injecting a gas at a workpiece center location and applying heat;" and "diffusion heat treating said at least one workpiece in a gas atmosphere with said gas being injected at said workpiece center location." Claim 1 is allowable because none of the references teach or suggest the claimed cleaning step and/or the claimed diffusion step.

Appellants' above comments about Burns are repeated herein. Neither JP '810 or JP '209 cure the deficiencies of Burns.

In the Examiner's Answer, the Examiner states that JP '810 or JP '209 teaches cleaning a furnace with inert gas

in a vacuum furnace chamber. A review of JP '810 shows that during the cleaning operation, the inert gas is sealed into the furnace from a gas supply pipe not shown in the figure (see page 8, lines 1 - 4 of the translation provided by the Examiner). Appellants submit that there is no teaching in this reference of injecting a gas at a workpiece center location. As for the '209 reference, it is directed to a method for surface hardening a workpiece. The surface hardening is performed by introducing a gas, such as acetylene, into a hole in a workpiece. Appellants cannot find any disclosure in this patent of performing any cleaning step. The Examiner's comments at the bottom of page 8 are noted; however, it is clear from the translation provided by the Examiner that the treating gas is not being used to clean anything. The treating gas, i.e. acetylene, is being used to surface hardening the workpiece. Thus, the Examiner's argument is deliberately misleading. As for the argument at the top of page 9, Appellants see the words are cleaned. However, the Examiner misses the phrase that follows: "are installed in the prescribed positions in the heating space within a vacuum." The reference is clear that the pipe and fixing appliance are cleaned prior to installation. There still is nothing that says that the cleaning operation is performed by injecting a gas at the workpiece center location. If anything, the cited portion shows that the reference does not perform the claimed method step.

With respect to the diffusion heat treatment step in claim 1, neither reference discusses or suggests a diffusion heat treatment step wherein a gas is injected at the workpiece center location. The Examiner relies upon the '209 reference for teaching or suggesting this step,

but this reliance is misplaced. As noted above, the '209 patent is directed to performing a surface hardening treatment, not a diffusion heat treatment. While the '209 reference shows a pipe for introducing a gas into the interior of a workpiece, there is absolutely no disclosure of introducing the gas at the workpiece center location. The word "center" does not appear anywhere in the translation. The Examiner's reliance on the drawings, as set forth on page 6 of the Examiner's Answer, is misplaced because there is nothing in the translation which says that what is shown in any of the figures is drawn to scale. As for the '810 reference, while it talks about a substance to be treated, there is no disclosure of what the substance is and what the treatment is. Further, there is absolutely no disclosure in the '810 reference of performing a diffusion heat treating step by injecting a gas at the workpiece center location.

The rejection fails because none of the cited and applied references teach or suggest the method steps set forth in claim 1. Thus, even if they were properly combinable, they would not render obvious the claimed invention.

With respect to the Examiner's argument on page 6 that "there is no factual evidence that injecting gas only at workpiece center location possess unexpected result," it should be noted that this argument fails for two reasons. First, Appellants are not required to show any unexpected results until the Examiner makes a *prima facie* case of obviousness, which the Examiner has not done. Second, paragraphs 0014 to 0016 of the specification discuss the prior art deficiencies including those of a cleaning operation such as that shown in the '810 reference. As can

be seen from FIGS. 3 and 4 of the application, Appellants achieve improved and unexpected results (results not recognized by the prior art) as a result of the claimed invention. Thus, Appellants have shown unexpected results resulting from the claimed method steps.

For these reasons, claim 1 is allowable over the cited and applied references.

Claim 2 is allowable because none of the cited and applied references teaches the claimed method step. As mentioned above, Burns is silent on the claimed flow rate. In particular, the JP '810 reference is clear that the inert gas is sealed into the chamber. Thus, there is nothing which teaches or suggests injecting the gas into the furnace at the claimed flow rate. In fact, JP '810 teaches away from the claimed invention. JP '209 does not perform any cleaning step. Thus, it could not possibly teach the claimed method step. Claim 2 is allowable because the Examiner has failed to make out a *prima facie* case of obviousness. With respect to the argument that the gas flow rate would be obvious because one would adjust the gas flow rate in order to balance cost of gas and cleanness of gas (page 7 of the Examiner's Answer), the argument makes no sense. It is not clear how one adjusts a flow rate to balance the cost of a gas and/or the cleanness of the gas. Even if these were considerations for adjusting flow rate, the Examiner has not made any showing of how one gets from these considerations to a flow rate sufficient to create a pressure differential which carries contaminants away from the workpiece center location toward an exit.

Claim 3 is allowable because the Examiner has not pointed out where the claimed method step of injecting a gas at a partial pressure of at least 0.8 Torr is shown in

any of the cited and applied references. In Burns, the ionized gas stream is not injected at a workpiece center location and is injected at pressures of 30 to 40 Torr. There is no discussion of using a partial pressure of at least 0.8 Torr when injecting the gas at the workpiece center location. The other references are totally silent on this point. It is submitted that the Examiner has failed to make out a *prima facie* case of obviousness.

Claim 4 is allowable for the same reasons as claim 2 and further because the Examiner has failed to present any line of technical reasoning which would allow one to conclude that a gas flow rate of 30 to 70 liters per minute during the gas injecting step used for cleaning would be obvious.

Claims 5 - 7 because none of the cited and applied references teach or suggest injecting an inert gas, argon, or a reducing gas at the workpiece center location as part of a gas injecting step during cleaning.

Claim 8 is allowable because none of the cited and applied references teach or suggest performing a diffusion heat treatment step by injecting a gas at the workpiece center location and heating to the claimed temperature. Burns talks about diffusion heat treating at a temperature within the claimed range; however, there is no disclosure in Burns of performing the diffusion heat treatment step by injecting a gas at the workpiece center location.

Claim 9 is allowable because none of the cited and applied references teach or suggest performing a diffusion heat treatment step by injecting the gas into the workpiece center location at the claimed rate. The only reference which discloses a diffusion heat treatment is Burns; however, there is no disclosure of performing the diffusion

heat treatment by injecting a gas at the claimed flow rate. Nowhere in the rejection does the Examiner point to anything in the prior art which renders this method step obvious. Since the Examiner has not made out a *prima facie* case of obviousness with respect to the subject matter of claim 9, there is no need for Appellants to show any unexpected results.

Claim 10 is allowable because there is nothing in the cited and applied prior art which teaches or suggests performing a diffusion heat treatment by injecting a gas at the claimed partial pressure. As discussed above, only Burns discusses a diffusion heat treatment step; however, there is no disclosure of performing such a step by injecting a gas at the claimed partial pressure. Further, there is nothing in the rejection which discusses how one of ordinary skill in the art would find the claimed subject matter to be obvious. Thus here too, the Examiner has failed to make out a *prima facie* case of obviousness.

Claim 11 is allowable because none of the cited and applied prior art teaches or suggests injecting a gas into the furnace at the claimed flow rate as part of a diffusion heat treatment step. Thus, the Examiner has failed to make out a *prima facie* case of obviousness.

Claim 12 - 14 are allowable because none of the cited and applied references teach or suggest injecting an inert gas, argon, or a reducing gas as part of the diffusion heat treatment step.

Claim 28 is allowable because none of the cited and applied references teaches or suggests providing a manifold within a chamber of the furnace for delivering gas to a center of the workpiece location area. Clearly, Burns et al. and JP '810 lack the claimed manifold within the

chamber. Neither one of the references delivers a gas to the center of the workpiece location area. With respect to JP '209, as discussed above, the only thing this reference teaches is delivering the gas to a hole in a workpiece. While there is a pipe for doing this, there is nothing which can be called a manifold within the chamber of the furnace. Further, even if one called the pipe a manifold, it does not deliver gas to a center of the workpiece location area. The figures in JP '209 are not drawn to scale and can not be relied upon to teach this aspect of the claimed invention and the reference never teaches delivering gas to the center of a workpiece location area. Even if one relies upon Fig. 1 in JP 209, the end of the pipe 40 is not at the center of the workpiece. It should be noted that the workpiece location area is different from the workpiece itself. The workpiece location area is an area where one or more workpieces may be located.

Claim 29 is allowable because none of the cited and applied references teach or suggest heating the furnace to a temperature which is 200 to 300 degrees Fahrenheit greater than a temperature at which the diffusion heat treating step is being formed as part of the cleaning step. The Examiner admits so with his argument on page 9 of the Examiner's Answer. It does not matter that the material is not specified in the claim. The only thing which matters is what is disclosed in the cited and applied prior art and the cited and applied prior art is silent on this claim limitation. The Examiner does not present any line of technical reasoning which would show this claim limitation to be obvious. In other words, the Examiner has failed to make out a *prima facie* case of obviousness. With regard to JP '810, there is no discussion of a diffusion heat

treatment in this reference. Consequently, there can be no teaching of the claimed subject matter flowing from this reference.

For these reasons, claims 1 - 14, 28 and 29 are allowable over the cited and applied references.

CONCLUSION

For the reasons set forth herein and in Appellants' Brief, the Board is requested to reverse the rejections of record and to remand the application to the Primary Examiner for allowance and issuance.

FEES

No fee is believed to be due as a result of this response. Should the Director determine that a fee is due, he is hereby authorized to charge said fee to Deposit Account No. 21-0279.

Respectfully submitted,
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IN TRIPLICATE

I, Karen M. Gill, hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on January 15, 2008.

